

# Dysnomy and Executive Processing Errors of SARS-COV-2 post-infection

Marco Orsini, Jacqueline Fernandes do Nascimento, Janie Kelly Fernandes do Nascimento, Antonio Marcos da Silva Catharino, Marcos RG de Freitas, Marco Antônio Alves Azizi, Thais de Rezende Bessa Guerra, Nicolle Nunes, Adalgiza Mafra Moreno, Jacemir Reis dos Santos Mallet

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**Keywords—** SARS-COV2; Dementia;  
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**Abstract—** Introduction: The disease SARS-CoV-2, named COVID-19, was officially declared a pandemic by the World Health Organization on March 11<sup>th</sup>, 2020. SARS-CoV-2 contains a single-stranded, positive-sense RNA genome surrounded by an extracellular membrane containing a series of spike glycoproteins resembling a crown. Neuropsychiatric manifestations are common during viral pandemics but are not effectively addressed. Case Report: We report the case of a man, 42 years old, who after the infection by SARS-COV2, presented dysnomia, cognitive easing and errors in motor processing. Results and Discussion: Studies have shown the neuroinvasive capability of SARS-COV2, resulting in neurological complications. Common neurological symptoms are headache, dizziness, anosmia, dysgeusia, mental confusion, and muscle weakening, progressing toward severe complications like cerebrovascular disease, seizures, muscle pain, and Guillain-Barre syndrome. The patient in the present case, about seven days after the initial infection, began to have difficulties in naming basic objects and "cognitive" slowness in the performance of basic and instrumental activities of daily life, especially those that required mutual tasks and that required concentration. Patients may be at higher risk of developing cognitive decline after overcoming the primary COVID-19 infection. Neuroinvasive capacities and neuroinflammatory events that may lead to the same short- and long-term neuropathologies that SARS-CoV had shown in human and animal models. The presence of dementia, minimal cognitive impairment and problems with motor planning and execution has been described. Conclusion: A structured prospective evaluation should analyze the likelihood, time course, and severity of cognitive impairment following the COVID-19 pandemic.

## I. INTRODUCTION

The potential involvement of COVID-19 in central nervous system (CNS) has attracted considerable attention due to neurological manifestations presented throughout the disease process. COVID-19 patients have presented a number of different neurological symptoms such as

headache, dizziness, hyposmia, and hypogeusia during the course of illness. It has also been reported recently that some cases of COVID-19 have presented with simultaneous acute cerebrovascular disease (acute ischemic stroke, cerebral venous sinus thrombosis, cerebral hemorrhage, subarachnoid hemorrhage), meningitis/encephalitis, acute necrotizing hemorrhagic

encephalopathy, and acute Guillain-Barré syndrome. Evidence suggests that the virus has both central and peripheral nervous system manifestations.<sup>1-4</sup>

Cognitive manifestations associated with the severity of a new coronavirus (COVID-19) infection are unknown, however, it can affect patients and compromise them in their work activities. Almeria M et al (2020), in our single-center cohort study, included adult patients, with ages between 20 and 60 years old with confirmed COVID-19 infection. The Neuropsychological assessment was performed by the same trained neuropsychologist. Individuals with previous cognitive impairment, any central nervous system or psychiatric disorder were excluded. Thirty-five patients were included in the study. The authors described patients presenting: headache, anosmia, dysgeusia, diarrhea. A particular group, who required oxygen therapy, had lower scores in memory, attention and executive function subtests as compared to asymptomatic patients. Patients with headache and clinical hypoxia scored lower in the global cognitive index. Memory domains, attention and semantic fluency in the working memory, mental flexibility and in phonetic fluency were also described in the sample. Higher scores in anxiety and depression were found in patients with cognitive complaints<sup>5</sup>.

The purpose of this article is to report and discuss the case of a patient, who after days of acute SARS-CoV2 infection began to show slowness of reason, difficulty in naming objects and loss of automation in the execution of some motor tasks.

## II. CASE REPORT

MAON, male, 41 years old, doctor with training in neurology, triathlete, without pre-existing diseases. He reports that on December 30<sup>th</sup> 2020 a condition started, marked by dry cough for two days with subsequent onset of fever and myalgia. This one started on 01\ 01\ 2020 and lasted for 72 hours (last episode). Symptoms of hypogeusia and hyposmia were observed on the fifth day of illness. After the quarantine period and the end of symptomatic treatment, he began to perceive difficulties in naming simple objects, although he recognized some. "Sometimes I look at a package of cookies, I know it is a package of cookies, but when I ask my children to get it, the name is not spelled by me". In addition, it points out that the processing time for executive functions has been "encouraged". Daily activities that required little complexity and quick execution have become less "automatic" and undoubtedly requires a higher level of attention. The patient signals that the act on focusing attention on relevant information and inhibiting irrelevant

information is hampered, as well as directing processes to perform complex tasks, and planning a sequence of sub-tasks to achieve a certain objective. Update and monitor, through working memory, the steps in progress to determine the next step in a sequential task, the problems also reported by the same. The encoding of representations in working memory according to space and time does not seem "normal" to you. In another words, there is a diversity in terms of theoretical models and cognitive processes involved in the executive functions of the present case that should be better explored. It draws our attention because it is a health professional with training in neuropsychiatry who, based on the assumption, has a broad understanding of these functions. Neurological Examination: Normal; Skull MRI: Normal; Liquor: Normal; EEG: normal. Battery of Neuropsychological Tests: Normal. Laboratory Complete with inflammatory, infectious and other markers that could cause problems like the ones above: Normal. Minimental Test: 28\30. However, during the formatting of the clinical picture and questioning, there is a delay between the receipt of information from researchers, speech processing and obviously slowness in the speed of responses. We have in mind that exams, such as PET-SCAN, would be necessary, and although our case is not interested in being exposed to new exams.

## III. CONCLUSION

A structured prospective evaluation should analyze the likelihood, time course, and severity of cognitive impairment following the COVID-19 pandemic.

## REFERENCES

- [1] Neurological Manifestations of Hospitalized Patients with COVID-19 in Wuhan, China: a retrospective case series study. Mao L. e cols. Preprint article. medRxiv preprint doi: <https://doi.org/10.1101/2020.02.22.20026500>
- [2] Pollard CA, Morran MP, Nestor-Kalinoski AL. The COVID-19 pandemic: a global health crisis. *Physiol Genomics*. 2020 Nov 1;52(11):549-557. doi: 10.1152/physiolgenomics.00089.2020. Epub 2020 Sep 29. PMID: 32991251; PMCID: PMC7686876.
- [3] Heneka MT, Golenbock D, Latz E, Morgan D, Brown R. Immediate and long-term consequences of COVID-19 infections for the development of neurological disease. *Alzheimers Res Ther*. 2020 Jun 4;12(1):69. doi: 10.1186/s13195-020-00640-3. PMID: 32498691; PMCID: PMC7271826.
- [4] Zhou Z, Kang H, Li S, Zhao X. Understanding the neurotropic characteristics of SARS-CoV-2: from neurological manifestations of COVID-19 to potential neurotropic mechanisms. *J Neurol*. 2020 Aug;267(8):2179-

2184. doi: 10.1007/s00415-020-09929-7. Epub 2020 May 26. PMID: 32458193; PMCID: PMC7249973.

- [5] Almeria M, Cejudo JC, Sotoca J, Deus J, Krupinski J. Cognitive profile following COVID-19 infection: Clinical predictors leading to neuropsychological impairment. *Brain Behav Immun Health*. 2020 Dec;9:100163. doi: 10.1016/j.bbih.2020.100163. Epub 2020 Oct 22. PMID: 33111132; PMCID: PMC7581383.